MUSEUM STORIES FOR CHILDREN

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FIELD MUSEUM OF NATURAL HISTORY

Series XX, Number 1
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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

REYNARD THE FOX

Foxes are related to dogs and jackals, but are superior to these cousins in sagacity, cunning and intelligence. The word "Reynard" means "strong in counsel" or "keen-witted." It is this characteristic which has caused the fox to be the chief actor in folk-tales of all lands and to continue to live in lands occupied by men and dogs.

Besides being unusually intelligent, foxes have other admirable traits. Their home life is the most ideal to be found among animals. The father fox protects the den and brings food to mother and young while the babies are small. He patiently and gently teaches the little foxes how to recognize and avoid traps and snares, how to trick the pursuing hound, how to keep cool in the midst of excitement and how to meet death without flinching.

Because of these characteristics, the fox has often appeared on totems. In ancient days, people were not supposed to look upon the living forms of their totem animals. Thus, in time, the fox became more imaginary than real to them. The fables of that period give to foxes the power to reason, to speak and to assume at will the form of some person, to do good to those in distress, or to harass those engaged in evil projects.

In Erris, a district of Ireland, foxes were formerly believed to understand human language, and there was a friendly feeling towards them, while over in Claddagh County the animal was feared. A Claddagh fisherman seeing a fox on his way to the shore, would not go to sea that day lest the fox bring evil upon him and his catch.

During the middle ages, the most popular animal story told in France and Germany was that of Reynard the Fox. Because of his many misdeeds, Reynard was repeatedly summoned to appear before Noble, the Lion, King of Beasts, to answer charges, and, as constantly, he avoided appearing. In various ways, he used his wits to lead his would-be guards into traps.

In early Chinese legends the fox played a most important part. Sometimes, it used the soul of a dead person and returned to earth to visit the living; sometimes, it helped the needy, but always it wore the fox tail. That it could not change, even though its body were that of a human.

The Tibetans have a delightful story of a wolf that had been tricked by a fox and sought revenge. After searching for some time, the wolf found the fox on top of a mountain weaving a basket. "Why are you

weaving a basket?" asked the wolf. The fox answered, "If you will enter this basket, you will know at once where there is meat and butter." The wolf being very hungry from his climb entered the basket. Then the fox rolled the basket down the mountain.

Africa too has its fox fables. The Hottentots tell their children a story about a jackal that persuaded Little Fox to twist a rope of ostrich sinews and play a joke on Lion by tying one end to his tail and the other to a bush while the huge beast was asleep. When the Lion awoke he demanded to know who had insulted him thus. One by one the smaller animals were questioned, and denied the charge. Finally he asked Little Fox. Said the latter, "I, child of my mother and father's love, I, mother and father's love, have tied thee." Then he ran so fast the Lion could not catch him.

America has numerous stories in which the fox appears. Some are simple tales of fox families; some are Indian legends in which the human-like characteristics of the foxes help the medicine-men or priests. Some are attempts to explain certain fox traits or markings.

Baldy is a fox character famed for his tremendous endurance and courage. Throughout a day and a half he led a pursuing hound a distance of one hundred and fifty miles only to fall exhausted in the end by the side of the dog as they both passed beyond the land of hunters. Then there is Brer Rabbit suggesting to Brer Fox that he secure some fire from the hole where the sun went down, to cook the game they had secured. No fire being forthcoming the fox sat over the hole all through the night, with his paws as far inside as possible. Those paws were in the way when the sun wished to shine upon the earth the next morning, so the sun scorched Brer Fox's legs, and the red fox has worn black boots ever since.

Thus have the foxes added to the richness of folk-lore in all lands.

MARGARET M. CORNELL, Guide-lecturer

Note: At the east end of Hall 17 is a case showing a splendid specimen of Red Fox. At the north end of Hall 33, among the block prints, may be seen a colored Japanese picture of dancing fox-maidens, and in Hall 7 are two dance costumes showing the manner in which the Hopi Indians use the red fox skins.

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STEPHEN C. SIMMS, Director

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FIELD MUSEUM OF NATURAL HISTORY
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BEAVERS AS ENGINEERS

The beavers are the largest rodents in North America. When the white men first came to this country, beaver dams, lodges and canals were common in regions of poplar, birch and willow. Today, due to the great demand for the excellent pelts, beavers have become rare except in protected areas.

As an engineer, the beaver ranks first among animals. He is well equipped for his work, and is a good planner. His front teeth are powerful chisels, his back feet are broad and webbed, his tail is broad and flat and scaled, and his front feet are used like human hands.

When a beaver family decides to move, it seeks a stream with a clay or gravel bottom located close to the kind of wood needed. The stream may be but a spring rippling over tiny stones. A few weeks after the beavers have chosen it as the source of their water supply, it becomes lost in a larger body of water known as a "beaver pond."

The first step in the making of a pond is the cutting of timber into lengths that can be pushed or dragged by the beavers. These are laid lengthwise on the bottom of the stream with the larger ends pointing upstream. Over these ends is placed a mass of stones and mud to weight them down. Then another layer is added and another until a dam reaching from side to side has been laid. By working roots and twigs into the brush and building the mass so that it curves upstream the beavers soon have a structure which resists the current and causes the water above to spread and deepen. Beaver Lake in Yellowstone Park is held by an old beaver dam 700 feet long.

Should a break or leak occur, the animals immediately repair it by forcing new materials into the opening. With their strong hands stones weighing as much as six pounds may be fitted into the cavity and mud wedged in until the dam is once more a solid wall. There are records of beavers having located and plugged leaks in man-made dams which human engineers had failed to locate.

Once a dam has caused a pond to form, the beaver family is ready to construct its dome-shaped lodge. Usually an upturned root or stone is used as a beginning. On this is piled mud and rocks until a solid base settles on the bottom. The mud used is taken from around the base. This leaves a ditch or moat which is most useful as the water there is deeper than elsewhere in the immediate neighborhood.

On this base is built the lodge. It is made of sticks plastered with mud cement and may be as much as 20 feet across and rise 3 to 5 feet

above the water. Inside is a round room about 2 feet high and 6 feet wide. It is reached by entrances which begin in the deep water and incline upwards until they open into the room above. The walls of this room are covered with mud and on the floor is a mat of twigs. It is here the beavers spend the winter safe from wolves and other molesting enemies.

Sometimes, beavers live in burrows by the sides of lakes or swiftly moving streams. In such cases, the burrow is above water level and under a root or clump of bushes. The entrance to it will be found in the water and sheltered by an overhanging rock or tree. Sometimes, the entrance is broad enough for a man to crawl through and leads back 10 or 20 feet before it broadens into a room. The most interesting thing about such a burrow is the method of securing air. The roof is made so thin that surface air can seep through. Should the roof cave in, the beavers cleverly mend it with a network of interlacing twigs and a covering of mud.

When the timber supply close to a beaver pond becomes exhausted, the animals either leave the region or build canals to the more distant supplies. Frequently, hillocks or points of land lie between the trees and the lodges. These only seem to cause the beavers to show their engineering skill to the best advantage. Trees and rocks disappear. The mud is removed and packed firmly along the sides until the canals look as if man had made them with machines. If necessary, branching canals wind around the foot of hills, and should the water supply be too small to float the logs, dams are constructed across the canals until the desired depth is obtained. Other canals may be cut across the points of land, thus shortening the distances the beavers must push the materials from forest to lodge.

Many meadows, today occupied by herds of sleek, dairy cattle, owe their beginnings to the engineering works of beavers who formerly lived in the neighborhood.

MARGARET M. CORNELL, Guide-lecturer

Note: In Hall 16, at the west end, is a habitat group showing the dams, lodges and work of a group of American Beaver.

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STEPHEN C. SIMMS, Director

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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

CRABS

Crabs are the scavengers of the sea and the beaches. They consume the decayed plant and animal material and thus cleanse the shore and water.

The crabs vary in size from the smallest pea crab, which lives within the shell of an oyster or mussel, to the giant spider crab of Japan. This crab often has a body eighteen inches long and twelve inches across, and measures ten feet or more from claw tip to claw tip.

Some crabs are strong swimmers and live their entire lives in the sea; other crabs burrow in the sand and scuttle among the rocks. Most crabs are good fighters, and will often avert danger by strategy. They are an interesting group of creatures with many amusing habits.

The hermit crab is one of the most interesting. Only the front parts of this crab are covered with a shell-like protection. This leaves the elongated abdomen soft and defenseless, so the crab must find a covering for that part of his body. He backs into one empty shell after another until he finds one that fits his body comfortably. As the crab grows in size, the shell becomes too small and a new home is hunted. Sometimes, the hermit crab locates a shell that suits him, but finds it occupied. This does not bother him greatly because he can usually pull the owner out and back himself into the shell. Thus the hermit crab carries his borrowed house wherever he goes.

The first right foot of the hermit crab is larger than the other feet and forms a claw. When the crab goes entirely into the shell he closes the opening with this large claw. Like other crabs, he walks in a sidewise fashion. The legs on one side are used for pushing and those on the other for pulling.

The fiddler crabs live in droves of thousands on the beaches. They are called "fiddler crabs" because the male has one very large claw resembling a fiddle and one smaller claw resembling a bow. These claws are continually being waved in the air with a motion similar to that of a bow and fiddle.

Fiddler crabs cannot swim, so when the tide comes in they bury themselves in their sand burrows; when the tide goes out, they dig themselves out again. The burrows are dug almost straight down in the sand for a depth of a foot or more. Some of the crabs build archways over their burrows. In one of these archways a crab can watch until the beach is free of danger, then go out and join his companions in the hunt for food. If enemies approach, the crabs scurry to their

burrows. They run quickly in their peculiar sidewise fashion holding the large claw in front as a protection. On reaching the burrow, the fiddler may find another crab seeking refuge there. The owner of the burrow swiftly throws the intruder out and makes himself safe.

The ghost, or sand crabs, colored like the sand, are the best runners. It is often hard for a man to overtake one. Not only does the crab run swiftly, holding his body high, but he darts and dodges so cleverly, that it is difficult to catch him. This peculiar crab wanders about the beaches at night looking for beach-fleas. He pounces upon a flea much as a cat springs at a mouse. The sand crab is always watching for danger. He stops frequently, raises his stalked eyes, stands on tiptoe and looks sharply about.

The spider crabs try to conceal themselves by planting such things as seaweeds and sponges on their backs which are rough and hairy. They select each object carefully, hold it in the mouth, moisten it with a secretion of mucus, and then fasten it on the back. In the tropics, is a crab known as the "sponge crab" because the last two pairs of the ten legs are adapted to holding a sponge over the back.

The Bahamas have very large land crabs which inhabit the shore in great numbers. The slightest noise disturbs them and sends them hurrying away to the bushes and grasses. As they go they clatter their large legs together.

The creature known as the "horseshoe crab" is really not a crab at all, but a living fossil. It is related to the long extinct trilobite. This strange animal lives in the Atlantic close to the shore. In early summer, thousands of them come ashore to lay their eggs in the sand. It is an odd sight because the males, being smaller than the females, ride on the backs of the mother crabs.

Crabs can be found in all seas. Not only are they valuable as beach cleaners but they serve as food. The blue crab, the most common on our Atlantic coast, has delicious meat.

MIRIAM WOOD, Guide-lecturer

Note: In Hall 29, in the black mangrove exhibit, is shown a ghost or sand crab coming out of its burrow; in Hall 38, at the south end, is a horseshoe crab and beside it a fossil trilobite.

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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

SPRUCE TREES

To most people the spruce tree is associated with Christmas time. Thousands of these lovely evergreen trees are cut and sent throughout North America to add to the beauty and joy of that happy season.

The spruce trees are common in northern Europe and make up a large part of our northern woods from the Atlantic to the Pacific. These tall, straight trees grow in great masses or pure stands unmixed with other trees. A forest of slender spruces is one of dignity and splendor. Each tree is shaped something like a pyramid. The branches are completely covered with needle-like leaves arranged in spirals and with a few cones hanging downward.

There are many kinds of spruces differing in size, shape, cones and color of the needles. The Norway spruce from Europe is one of the tallest and stateliest of European trees. It grows as high as 150 feet. The trunk of this magnificent tree is so straight, slender, strong and yet light in weight that it makes the finest masts and spars for sailing vessels.

The black spruce, growing mainly in Canada, is very abundant on the plains and slopes there. It grows rapidly, attaining its growth in twenty-five to thirty years. For this reason, black spruces are planted to reforest where other trees have been destroyed. In just a few years an ugly, vacant stretch of ground can be converted into a young spruce forest.

Boys, living in the country, often gather the resin or gum that oozes from the trunks of the black spruces. This makes a very good chewing gum. The black spruce has a far more important use, however, than the production of spruce gum. The wood is the material from which thousands of newspapers are made. Great forests of spruce trees are cut down completely to make newspapers. As soon as the trees are cut, others should be planted in their places. Thus, there is a continual industry centering around the black spruce.

These cut trees are stacked in great piles along the rivers. They are pushed into the water and floated downstream to the paper mills. It is remarkable how this wood is changed into paper. Great logs are stripped of their bark and cut into small chips. The chips consist of vegetable fibers, the necessary material for paper. They are ground up, cooked and churned with water until they form a smooth, creamy pulp. This is allowed to run out and dry in a continuous sheet. Thus, paper is a thin felt of vegetable fibers. These fibers are visible, with

close observation, in some papers. With the aid of a microscope, they can be plainly seen in all papers.

Chips of black spruce wood are also ground up, cooked with water and treated until almost pure cellulose remains. Cellulose is the material of which plant cells are made and is a very important substance. When all other substances have been removed and the cellulose is in an almost pure state, it may be dissolved and form a gummy solution. This is forced through a fine sieve, like a nozzle of a sprinkling can, and issues in delicate but strong threads known as artificial silk.

On the western coast of North America, from California to Alaska, the Sitka spruce can be found. The wood of this spruce is unsurpassed for airplane construction. It is tough, light in weight, does not splinter easily and is shock absorbing. During the World War great regions of Sitka spruce trees were cut and used for airplanes.

Today the Haida Indians of the Northwest Coast make beautiful baskets, hats and mats from the Sitka spruce bark and roots. The baskets are so finely woven that when swollen with moisture they hold water like a jar. Some are decorated with figures symbolizing the mythical history of the tribe. The Indians use the bark for tanning skins, while the rosin from the tree trunks yields some turpentine.

Many spruces, because of their beauty, are being used as ornamental trees in parks and lawns. The smaller white spruce adds much dignity and grace to any landscape, but the blue spruce from the Rocky Mountain regions is considered the most beautiful. It is so-called because the needle-like leaves are often bluish in color and sometimes are more attractive with a tinge of silver.

The rarest of American spruces is the weeping spruce. This tree has long, graceful, weeping branches and is especially ornamental. However, it cannot be cultivated far from its home along the state line of California and Oregon.

MIRIAM WOOD, Guide-lecturer

Note: In Hall 26 you may see exhibits of spruce trees. In Hall 28 are exhibits showing the production of paper and artificial silk from spruce chips. There are Indian mats, baskets and hats made from the bark and roots of the spruce in Hall 10.

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FIELD MUSEUM OF NATURAL HISTORY

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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

THE AMERICAN PORCUPINE

Should you, on passing through a hemlock or jackpine forest, notice several trees with bark removed and leaves missing, look for the culprit somewhere near. He may be sitting on a limb directly over your head. Have no fear that he may drop or run away.

Of all North American rodents, the porcupine is the most stupid and the slowest in movement. Why should he hurry? Has he not thousands of daggers on his back and tail? And does he not know that by thrashing that tail from side to side he can drive those poisonous daggers into any flesh that happens to come in contact with that tail?

To the timber men the porcupine is a hated nuisance. He not only girdles the trees and ruins millions of feet of timber, but he invades the camps. There anything that has had salt or grease in it is chewed to shreds. Salt is one of the favorite foods of the porcupine and to get it he will even eat mud having brine in it. Laundry soap disappears like magic, and cast antlers are gnawed for the grease and salt they contain.

The porcupine has many names. To some he is "Quill pig"; to others he is "Prickle-cub," while his most common nickname is "Porky." All suit him well. He is thickset, short-faced and small-eared. The front teeth are deep orange in color, the coat is brownish-gray and the quills are white with black tips.

The quills are found everywhere except on muzzle, underparts and legs. Those on the head are one inch long and those on the back four inches long. The quill tips are hard and sharp and highly polished in appearance. The quills are concealed in the wool and hair and sometimes are difficult to see.

When an enemy approaches a porcupine, Porky immediately hides his head under a log or root, or between his own front legs, and lies flat on the ground. Instantly, the tail begins to lash from side to side, and woe unto the animal that is too near. At the body end, the quills are loosely attached, so all that is needed is a forceful slap and several barbs are closely imbedded in the mouth or coat of the bothering foe. There the barbs clinch and trouble begins. If the barbs are not removed, death sometimes ends the suffering of the animal. As each porcupine has over 30,000 poisonous barbs or daggers on his quills, he can wage a lengthy battle.

Most animals give the porcupine the right of way. But not the fisher. This marten-like animal has no fear of Porky or his quills. Though he be stabbed again and again, no harm is caused. He seems to be immune in some way to the quills. So when he desires a feast, he searches out a porcupine. Porky stupidly thrusts his head out of the way in the usual manner. Quick as a flash, the fisher's paw shoots under the porcupine, and before the dazed animal has sensed what has occurred, the fisher has him on his back and killed. Indians living in regions infested with porcupines consider porcupine meat a luxury. It is said to be coarse, but like beef in flavor when the animal is young.

The young porcupine is larger than a baby black bear at birth and like its parents makes its wants known by a series of sniffs, grunts, squeaks and shrieks.

All porcupines are solitary animals, wandering about by themselves. Occasionally, two will meet at some water-lily bed and both attempt to use the same log. Under such circumstances a quarrel is apt to occur and one get pushed into the water. They do not especially like swimming, but will paddle some distance when necessary. The quills being full of air act as floats.

The American Porcupine is much smaller than the kind found in Europe. The latter is a most formidable-looking animal. Its stiff hair and exceedingly long large quills which flare out from face backward, have made this animal very famous in stories of the regions in which it is found.

No matter where the porcupines live, they destroy trees and in other ways prove they are rodents which have a very bad reputation.

MARGARET M. CORNELL, Guide-lecturer

Note: In Hall 15 may be seen both the American and European forms of porcupines. In Hall 16, in the Moose Habitat Case, is shown a porcupine following the moose in hopes the moose will dig up some water-lily roots. In Hall 5, are many pipes, blankets, moccasins and other garments decorated with porcupine quills, while in Hall 4 is a small model of a birchbark canoe with porcupine quill designs on the sides.

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FIELD MUSEUM OF NATURAL HISTORY
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THE SECRETARY BIRD

In the dry, open parts of Africa there is a very unusual bird, known as the Secretary Bird. It has been described as a "large bird with a head like an eagle and long legs like a stork." It stands three to four feet in height and measures about seven feet from wing tip to wing tip. It is an ashy-gray color with black feathers in the wings and tail. The wrinkled skin around the crooked, strong beak is reddish-orange in color. On the back of the head are several long, black feathers that can be lifted. Each feather (using your imagination) resembles a quill pen stuck over the ear of a clerk or secretary—thus the name "Secretary Bird."

These birds are usually seen in pairs marching at some distance apart across the grassy veldt in search of food. Even the ostrich is less stately than the Secretary Bird as it stalks along with great dignity and measured stride. Since it lives almost entirely on the grassy, open places, the bird can see in all directions and usually can sight an enemy while still some distance away. On catching sight of a foe, the bird often forgets its dignity and runs with such remarkable swiftness that it seems to "skim the ground." It is then useless to try to chase one. It runs with the speed of a horse. One bird was followed for ten hours. All this time the bird walked swiftly, stopping occasionally to feed, but going on whenever the man came too close. Not once did the bird fly or break into a run.

The Secretary Bird seldom takes to wing. If suddenly surprised, it sometimes raises its huge wings, beats the air several times, runs to get up speed and launches into a flight. This is never a long flight, but every movement of it is graceful. When coming down the bird circles around and lands facing the wind. This taking off and landing resembles very much that of a miniature aeroplane.

The plot of ground selected and occupied by each pair of birds is regarded as personal property by the two. Should other birds enter this area, the Secretary Birds resent the intrusion greatly and drive them out. Some high bush or low mimosa tree in their favorite area is chosen for the nest site. The nest is very large and is constructed of sticks and grasses roughly massed together on the top of the bush or tree. The same nest is used year after year. It sometimes has new material added to the old or it has to be repaired. There are usually just two bluish-white eggs. The mother bird sits quietly on

the eggs and one sees only the long, black tail hanging on one side and the funny reddish-orange face peering over the other side.

The mates seem to be fond of each other. Once when a male bird was killed, the female came and excitedly paced around and around the body of her dead mate.

When the little ones hatch out they are very helpless and must remain in the nest for several months. The long legs of these young birds are so weak and brittle that the baby birds do not stand on them but crawl about the nest. At the age of four months, they are not able to stand upright. One young bird was taken from the nest and placed on the ground. There it tried to stand on its legs; each one immediately snapped in two pieces. After a long time the young birds are plumed and able to leave home but they return to the nest every night to roost.

Secretary Birds are rare in many parts of Africa, but in the Cape regions they are protected and abundant. Here the natives consider it taboo to kill a Secretary Bird and the farmers like to keep them on their lands as pets to aid in the destruction of harmful snakes, lizards, toads, frogs and insects.

The birds are especially noted for killing poisonous snakes. When killing such a snake, the bird spreads out one of the large wings as a shield to protect the body and thighs from the venomous bites of the snake. Sometimes the bird strikes the snake with a strong blow from one of the powerful feet. This usually stuns the snake. Then often, it beats the reptile using its feet something like a sledge hammer. These blows are so powerful that they can be heard far away. Or, perhaps, after the snake is stunned, the bird seizes it in its beak and tosses it backwards and forwards until it is dead. Frequently, the bird watches for a chance to grasp the snake near the head, then flies to a considerable height and drops it to the ground. This sudden, hard fall usually kills the snake and the bird swallows it. The Secretary Bird is not immune to the poison of a snake and if bitten dies quickly.

These birds have been kept successfully in captivity although they are easily and seriously frightened by strangers.

MIRIAM WOOD, Guide-lecturer

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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

YELLOWSTONE PARK

Early traders and explorers in the west heard from the Indians of a strange and awesome place known as a land of magic. From the name of the first white man to enter the region it was long known as Colter's Hole, now it is called Yellowstone Park. Another white man who early visited it was Jim Bridger, a famous trapper, but for a long time the descriptions from those who had visited the region were regarded as fantastic tales or plain lies.

Since 1872 this truly wonderful region has been a national park, so that its attractions are preserved for everyone. It is a place of dying volcanoes. There are no longer any active volcanoes, but old craters, thick lava sheets, geysers, hot springs, and the underground heat still testify to the intense heat of the past.

Perhaps the main attraction of the park is the geysers. Underground openings fill with water which is heated by the hot rocks roundabout. When some of the water overflows steam is formed which blows out the remaining water into the air. At least artificial geysers built along this idea work just as real ones do, so it is believed to be the true condition.

Old Faithful for a long time spouted regularly every sixty-four minutes, shooting water 150 feet into the air. In the last few years, however, it has been slowly becoming less regular, it now spouts every sixty to ninety minutes. All geysers in time become quiet. The Giant Geyser hurls its waters 250 feet high for an hour at a time, only it is not as regular as some, for it spouts at intervals of from five to seven days. In all there are about one hundred geysers in the park.

Hot springs differ from geysers only in that the water flows or boils from the earth without being blown into the air. Morning Glory Pool is one of the most beautifully colored pools in the park. The Handkerchief Pool readily cleanses handkerchiefs which are tossed into the boiling water. Several times, however, so many have been tossed into it as to clog the pool and require cleansing before it would flow again. The Fishing Cone in Yellowstone Lake contains water so hot that a fisherman after catching a fish in the lake can suspend it in the hot spring until it is cooked. The Paint Pots contain many colored clays which sputter and boil. Mud geysers at intervals eject mud into the air.

The warm and hot waters contain minerals (chiefly silica) which are dropped from the waters. This dropping is due to cooling, also to the algae which abound in waters slightly below the boiling point. The algae give brilliant colors to the water and deposits (geyserite), although when the water ceases to flow the plants die and the colors disappear.

The outlet of Yellowstone Lake, Yellowstone River, enters a beautiful 2,000 foot gorge by means of a falls. The upper part is 109 feet high, the lower measures 308 feet—the gorge and falls constitute one of the most impressive sights in America.

In numerous places petrified trees are found. Most of them were killed by being covered with volcanic debris whose silica-charged waters changed the trees into stone. In Amethyst Mountain no fewer than fifteen forests were in this way covered and buried one after another; now they may he seen one above another with the volcanic ash layers between. In addition to the deposits of volcanic debris there are many lava flows. In places the volcanic material (debris and lava) is at least 3,000 feet thick.

Death Gulch is one of the tragic spots of the world. Poisonous gases kill everything living that enters, as the skeletons of animals and absence of plants indicate. Ernest Seton-Thompson has written of this gulch in his book, "The Biography of a Grizzly."

The wild life in the park has flourished under protection so that now it is really abundant. Among the commonly seen animals are buffalo, elk, deer, antelopes, beavers, bears, and coyotes. The plant life is also protected and flourishes: many varieties, which elsewhere are rarely if ever seen, grow freely in the park.

With all of these wonders it is not surprising that Yellowstone Park is one of the great attractions of the world.

FRANKLIN C. POTTER, Guide-lecturer

Note: In Hall 34 there is a specimen of geyserite, and in Hall 35 there is a relief map of Yellowstone Park.

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STEPHEN C. SIMMS, Director

MUSEUM STORIES FOR CHILDREN

Presented by

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FIELD MUSEUM OF
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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

POLLEN AND NECTAR CARRIERS

Have you ever pulled apart a clover head and then placed one of the tiny flowerettes in your mouth? If so, you learned that deep down in the throat of the clover blossom was something that tasted very fresh and sweet.

That sweet substance in flowers is known as nectar. It is the material from which bees make honey. Also, it is the pay the insects and other plant visitors receive for carrying pollen from a flower of one kind to another of the same kind. This nectar is kept in little pockets. Sometimes, it is easily seen, but usually the insects must work hard to obtain it. In so doing, their heads, backs or legs are apt to touch some stalks which have bags of pollen at the top. Bumblebees have such sharp mandibles that they frequently cut through the walls of the nectar pockets instead of going into the flowers, and thus get no pollen. Without pollen no seeds are produced.

Pollen is that yellow powder which clings to the tip of your nose if you plunge it too far into tulips or dandelions. It is one of the most important parts of a flower and to secure pollen plants do some odd things.

Some have separate pollen flowers up above the seed flowers. Corn belongs to this kind of plant. Some plants swing their pollen stalks out so that the wind can carry the pollen. Grasses do this. Most plants have insect or spider friends which visit their blossoms.

To have the right kind of visitor, plants resort to various schemes. They may have brilliantly-colored petals which flaunt their brightness as long as any pollen remains; spots and lines may show the way to the nectar feasts; special odors may be just the right invitations to flies and beetles, and some flowers are ogres which hold their guests in traps for a time.

On dry, exposed spots of the dunes, we often see (and feel) a kind of cactus called "Prickly Pear." When the sun is shining brightly the golden petals open wide and the bees, being fond of yellow, come to call. As evening comes on or a storm approaches, the petals fold up. The bees must then force a way through a small opening at the top. As this cactus has no nectar, it uses this method of getting pollen from another flower. In the scramble to gain its freedom, the bee imprisoned within the folded flower loses some of the pollen collected in some other flower and picks up grains from the cactus being visited. This is exactly what the cactus wants to happen. In time, the pollen brought finds its way into the seed-house.

In grandmother's garden there is apt to grow a figwort. If you look carefully at a blossom of this plant, you will discover clinging tightly to the center of the flower a wasp. He is so much like the yellow and brown of the flower that he appears to be part of the bloom itself. Figworts compel the wasps to push their heads down into the tube in order to secure the nectar. Thus they are sure to touch the pollen.

Many flowers have deep, throat-like tubes or spurs. Then butterflies and moths are the flower friends. The hawk-moths are especially fitted for obtaining nectar from such blossoms as petunias and gentians, as their tongues are very long and hollow and curl up like watch springs when not in use.

The trumpet creeper has several interesting nectar guests. Tiny insects, thirsting for the sweetness deep in the throat, crawl within. The hummingbird also likes nectar, but it likes insects equally well. Hence its trips to the trumpet creeper have a double purpose. With its dainty, needle-like bill it drains the nectar and picks up the insects.

Orchids are rare and weird flowers. The colors are delicate and the shapes unusual. Most orchids have pouches like our lady-slippers, or one petal enlarged to form a hood and another to form a landing platform. The pollen sacs do not loosen and let the pollen out as in other flowers. As a visiting insect passes in to gather nectar, it presses against the pollen container. A tiny bit of plant skin with a sticky substance is fastened to this container. When this touches the insect's head or proboscis or leg it separates from the stem and sticks to the insect. The sticky substance hardens as the air strikes it. Thus the insect just has to carry the pollen to the next orchid it visits.

As bees, wasps, flies, butterflies and moths have their favorites among the members of the plant family, and each likes some colors and dislikes others, there is plenty of nectar and pollen for all. Thus certain insects and certain flowers have formed a kind of partnership by which the blossom gets the pollen from another flower and the visitor receives the nectar.

MARGARET M. CORNELL, Guide-lecturer

Note: In Hall 29 may be seen many plants with blossoms. Notice especially the trumpet creeper exhibit.

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STEPHEN C. SIMMS, Director

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FIELD MUSEUM OF NATURAL HISTORY
Roosevelt Road and Lake Michigan
CHICAGO

PENGUINS

In the seventeenth century, some Spanish navigators sailing in the South Atlantic came across a flock of birds unlike any they had seen elsewhere. The bodies of the odd creatures were covered with layers of fat, so the sailors called them "pinguinos" from their word for grease.

From that day to this, people have been much interested in both the past and present forms of penguins. Fossils of those that lived in the Antarctic region about the time that the four-toed horses were roaming over the western part of our own country, show the penguins of that far-away day to have been birds much like those of today.

Penguins are birds of shore and water. There are no quills in their wings, so they cannot fly. The stout little arms are covered with feathers which overlap, and have become flippers capable of great speed and endurance. In traveling from their summer homes to the winter feeding areas some species cover long distances. The Adelie Penguins have been known to swim as much as one hundred miles a day.

Penguins are well-suited to long stays in the water. Their legs act as rudders, never as paddles, and as soon as their heads go under the water a transparent film comes over the eyes and oil gradually spreads over the body and converts the overlapping feathers into a raincoat. In the throat are little bags which are filled with air before the birds dive. They do not swim on the surface as do ducks and similar birds, but glide gracefully and easily beneath the surface. The water is their playground and the source of their food supply. Crustaceans and small fish are the favorite food.

When standing, penguins look like little men wearing white trousers and vests and dark coats with pointed tails which are forever dragging on the ground. In walking, they hold their bodies very erect with tiny heads pointing upward. Due to the shortness of the legs their gait is more of a wobble than a walk. If in a great hurry, or tired from walking, they drop onto their stomachs and scuttle along over the ground or ice using both legs and flippers as pushers.

Penguins are found from the Galapagos Islands to the Antarctic Continent. Some, like the Cape or Jackass Penguins, never see ice; others spend their entire lives in the polar regions. The largest members of the penguin family are known as Emperor Penguins. They are very beautiful birds with jet black heads, bands of yellow on each side of the head and purplish-rose beaks. In height they are about forty

inches. Like the Adelie Penguins, these magnificent birds are true Antarctic inhabitants. They spend their time on icebergs. It is here that one egg is laid in the middle of the winter darkness. The egg is held on the foot of the parents, being passed from one to the other and covered with the soft down of the body. When the youngster finally hatches, every Emperor Penguin in the group, which does not have a chick of its own, desires to hover the baby. The little penguin frequently suffers badly from too much care.

Visitors to the south polar regions are always much amused by the reception accorded them by these penguins. When meeting people, they greet them as they would members of their own family. That is, they bow to each other and then lowering their beaks onto their breasts they seem to talk for a time. Finally, they raise their heads and swing them around until the beaks have completed a great circle. Then they pass on.

The Adelie Penguins are perhaps the best known as they are found everywhere in the Antarctic. When nesting time comes, they leave the open water, where they have spent the cold months, and seeking some land from which the wind has blown the snow, build their nests. These are mounds of stones collected by the male birds and placed by the mother birds. Some penguins are very quiet and orderly and will let men stroke them while on the nests, but the Adelies are quarrelsome and noisy and always looking for trouble. As thousands locate at one rookery, and the nests are so close together that birds can reach each other, there is a constant warfare going on between the mother birds as well as between the males. However, the Adelies are brave little fellows, always ready to face danger or foes and deal cruel blows with beak and flipper when necessary.

Whether the penguins belong to the kind which makes its nests in hollowed out holes in the ground, to the stone-mound type or to the nestless kind, all are prey to the attacks of whales and seals and skuas. The battle for existence is just as fierce in the Antarctic as elsewhere and the penguins must be ever alert.

MARGARET M. CORNELL, Guide-lecturer

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FIELD MUSEUM OF NATURAL HISTORY
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THE FLIGHT OF BIRDS

The sight of a bird flying is such a common one that it is rarely regarded with much interest or excitement. The bird seems to accomplish this marvelous feat of flight without any effort but should you stop to watch you would be surprised at the various movements.

In the very busiest parts of the city live pigeons and sparrows. If their flights were not so accurate and their turns and darts so true, they would never survive in the whirl and dangers of city life.

Flying comes natural to birds. The first flights of young birds are usually awkward and imperfect but they are not taught to fly. The parent birds may teach the young ones how to take off and to land but the ability to fly itself is never learned—it is already there.

It is a well known fact that baby birds cannot fly until their wings have grown and are covered with strong quill feathers. Thus the wings must play the most important part in flight. The wing is a modified fore leg, just as the arm of man is a modified fore leg.

It is interesting to notice how the feathers are arranged on the wing. They overlap each other with the free edges facing the outer edge of the wing. This may seem odd and trivial but only with such an arrangement is flight possible for the bird. When the wing is brought up on the up-stroke the feathers are apart and open like a shutter. Then the wind passes through with no pressure on the wings. On the down-stroke the feathers are pressed together tightly and the pressure of the air on the wings sends the bird forward and upward.

There are other aids for the flight of birds. The bones are hollow and very light in weight. The breast muscles are strong and give power for the down-strokes.

The size and shape of the wing depends upon the place where a bird lives. Swallows and sea gulls of the open meadows and seas have long, pointed wings. Birds of the woods and thickets have short, stubby wings.

The noise of the wings in flight varies from the whistle of the stiff grouse feathers to the almost noiseless whisper of the downy owl feathers. Flight sounds are very important to birds. For instance, birds like the grouse and pheasant remain motionless in the grass until danger is almost on them. Then, like a shot, the bird is off and the "whirr" of the wings so startles the enemy that the bird has flown to safety before the person or animal can recover. The owl must wing its way in the twilight and swoop down on an unsuspecting

mouse so quickly and silently that the mouse cannot possibly hear and escape.

Soaring is one of the most marvelous and beautiful of flights. Eagles, falcons, buzzards, pelicans, vultures, adjutant storks and albatrosses are the best soarers. When the bird starts to soar it rises for the first 100 feet or more by rapid, powerful strokes of the wings. Then seemingly without any effort or wing beats, the bird sweeps around in great spirals. During the first part of each spiral the bird goes slightly downward, but as it circles around into the wind, it is carried up and up. Thus these birds can soar into the heavens for great heights. The adjutant stork goes up merely for the pleasure of soaring while the vulture goes aloft to scan the ground for food.

The kingfisher and the hummingbird are among the few birds that can hover or hang in the air. The hummingbird feeds on flower nectar as it hovers with almost unseen quivering wings. The kingfisher skims over the river watching the water for fish; suddenly it swoops up and hangs in midair with swiftly moving wings then like a flash plunges down into the water for a fish.

In the spring birds try to attract the attention of their mates with exquisite songs, unusual flights and strange actions. The spiral flight of the woodcock is known to most bird lovers. This bird flies to a great height and then plunges to the earth in a "nose dive" with a strange noise.

Birds show great powers of endurance during their migration flights. Many birds migrate at night and at such great heights that they cannot easily be seen. However, they can frequently be heard. The loud honking of the geese, as they fly in v-shaped formation high above, carries for miles. The longest non-stop flight of any bird is made by the golden plover. In the fall it leaves the coast of Labrador and flies out over the Atlantic Ocean for 2,500 miles to South America, its winter home.

Watch birds in flight whenever possible.

MIRIAM WOOD, Guide-lecturer

Note: In Halls 20 and 21 are many birds shown at rest and with wings spread as in flying.

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